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(54) POWER TRANSMISSION COUPLINGS

(71) We, DAVID BROWN GEAR INDUSTRIES LIMITED of Park Works, Huddersfield in the county of York, a British company do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to power transmission couplings, and has for its object to render unnecessary the use of coupling halves forged or cast in one piece and thus to reduce the cost of production of power transmission couplings.

According to the invention, a power transmission coupling includes two coupling halves each of which comprises a sleeve secured to a flange by electron beam welding.

Two embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings of which:—

Fig. 1 is a sectional side elevation of a gear-type coupling on a section in two planes which intersect at a suitable angle, other than 180°, at the axis of the coupling; and

Fig. 2 is a sectional side elevation of a resilient coupling.

In one embodiment of the invention, a gear-type coupling comprises two coupling halves adapted to be rigidly clamped together. Referring now to Fig. 1 of the drawings, each coupling half consists of an internally toothed sleeve 10 secured by electron beam welding at 11 to a pressed flange 12 and by electron beam welding at 13 to an oil seal housing 14. The teeth 15 on each sleeve 10 are adapted to mesh with external teeth 16 on one of the shafts 17 to be coupled together, and an oil seal 18 in each housing 14 runs on a track 19 on one of the shafts 17. The flanges 12 of the two coupling halves are provided with a plurality of circumferentially spaced punched clearance holes 20 for the reception of bolts 21 for clamping the flanges 12 together, and each flange 12 is provided with a pressed axial projection 22 and a punched hole 23 diametrically opposite said projection on the same pitch circle diameter.

In operation, the projection 22 on one flange 12 engages drivably in the hole 23 in the other flange 12. Thus the clamping bolts 21 do not transmit any driving torque. The flanges 12 and oil seal housings 14 are formed of mild steel, and the toothed sleeves 10 of high carbon steel.

In a modification of said one embodiment, the punched hole 23 in each flange is replaced by a punched depression. Various numbers and dispositions of projections and mating depressions or holes can be employed, but it is clearly advantageous, though not essential, to arrange them so that the flanges 12 are identical.

In another embodiment of the invention, a coupling comprises two coupling halves adapted to be resiliently connected together. Referring now to Fig. 2 of the drawings, each coupling half consists of a sleeve 24 with a tapered bore 25 and a pressed flange 26 secured by electron beam welding at 27 to the narrower end face of the sleeve 24. Each sleeve 24 is connectible by a taper-lock bush 28 to one of the shafts 29 to be coupled together. In each of a plurality of circumferentially spaced punched holes 30 formed in one of the flanges 26 there is secured a pin 31 which projects from said one flange 26 on the side remote from the sleeve 24 welded to said one flange 26. Into each of a plurality of relatively large diameter holes 32 punched in the other flange 26 alignment with the pins 31 there is pressed a cylinder 33 which projects from said other flange 26 on the side adjacent the sleeve 24 welded thereto. Each cylinder 33 houses a series of resilient rings 34 the outer periphery of each of which is narrower than its inner periphery. Driving engagement between the two coupling halves is effected by locating each of the pins 31 on said one flange 26 in the bores of one of the series of resilient rings 34 carried by the other flange 26. The shape of the resilient rings 34

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enables them to yield without sliding to relative axial movement between the two shafts 29 connected by the coupling, so as to reduce considerably the end thrust transmitted from one coupling half to the other.

In a modification of said other embodiment, the resilient rings 34 of each series are united to form a resilient bush with a series of annular grooves. In another modification, the holes 30, 32 in each flange 26 are drilled instead of punched. In a further modification, each sleeve 24 has a parallel bore for mounting directly on one of the shafts 29 to be coupled together instead of being connectible thereto by a taper-lock bush 28.

WHAT WE CLAIM IS:—

1. A power transmission coupling including two coupling halves each of which comprises a sleeve secured to a flange by electron beam welding.

2. A power transmission coupling according to claim 1, wherein the flange of each coupling half is a pressing.

3. A power transmission coupling according to either of the preceding claims, wherein the sleeve of each coupling half has internal gear teeth adapted to mesh with external gear teeth on a power transmission shaft.

4. A power transmission coupling according to claims 2 and 3, wherein each flange is provided with a plurality of circumferentially spaced holes for the reception of bolts adapted to clamp the flanges together, and with at least one pressed axial projection and at least one depression or hole, the or each depression or hole in one flange being engagable drivably by the or one of the projections on the other flange.

5. A power transmission coupling according to claim 4, wherein the two flanges are identical.

6. A power transmission coupling according to claim 4 or claim 5, wherein the holes for the reception of the clamping bolts are clearance holes.

7. A power transmission coupling according to any one of calims 4 to 6, wherein the holes in both flanges are punched.

8. A power transmission coupling according to any one of claims 3 to 7, wherein an oil seal housing is secured to the sleeve of each coupling half, at that end remote from the flange, by electron beam welding.

9. A power transmission coupling according to claim 1 or claim 2, wherein the sleeve of each coupling half is connectible rigidly to a power trnsmission shaft and the two flanges are connectible together resiliently.

10. A power transmission coupling according to claim 9, wherein the two flanges are connectible together by a plurality of circumferentially spaced pins projecting rigidly from one flange, each pin being engagable in the bores of a series of resilient rings, the outer periphery of each ring being narrower than its inner periphery, and each series of rings being carried by the other flange.

11. A power transmission coupling according to claim 10, wherein the rings of each series are replaced by a resilient bush with a series of annular grooves.

12. A power transmission coupling according to claim 10 or claim 11, wherein each series of rings or each bush is housed in a cylinder pressed into a hole in said other flange.

13. A power transmission coupling according to any one of claims 9 to 12, wherein the sleeve of each coupling half has a tapered bore and is connectible to the associated shaft by a taper-lock bush.

14. A power transmission coupling constructed, arranged and adapted to operate substantially as hereinbefore described with reference to, and as illustrated by, Fig. 1 of the accompanying drawings.

15. A power transmission coupling constructed, arranged and adapted to operate substantially as hereinbefore described with reference to, and as illustrated by, Fig. 2 of the accompanying drawings.

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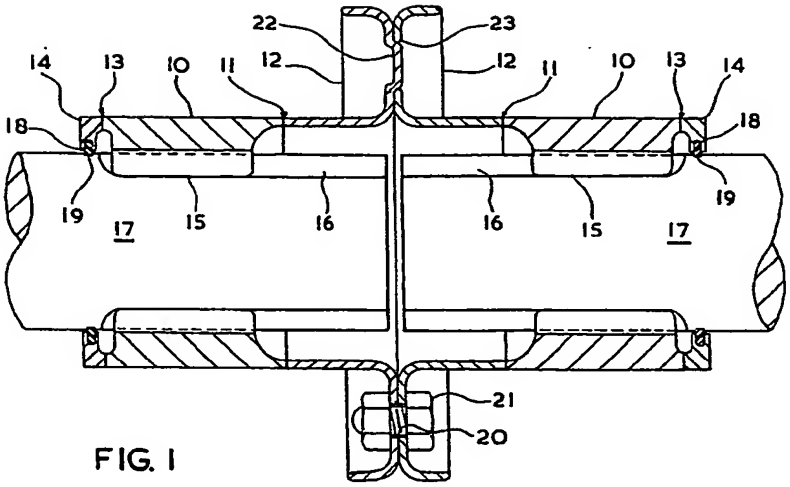
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FIG. 1

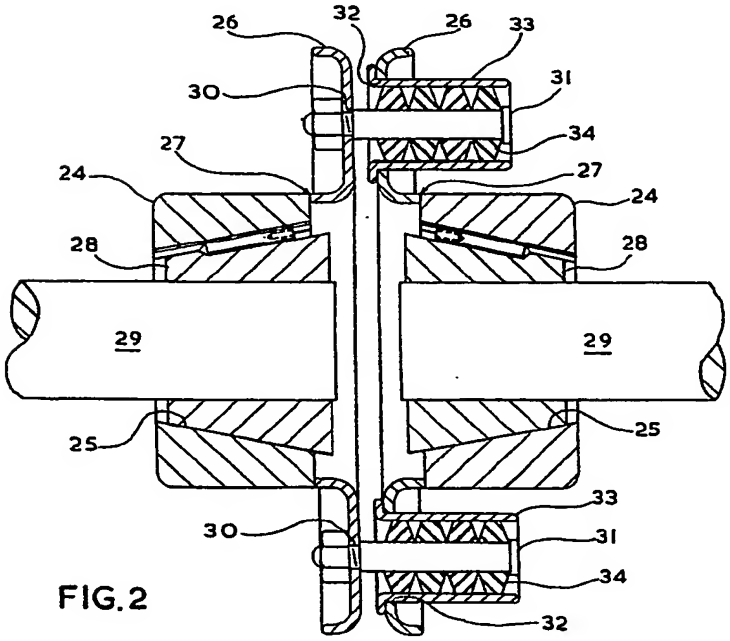
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FIG. 2